U.S. EPA Landfill Methane Outreach Program Preliminary Screening Analysis Report for Oxford Landfill

A landfill gas generation curve was developed for the Oxford Landfill in Oxford, NC, using several parameters specific to the landfill and defaults from AP-42[1]. These data were entered into the EPA LandGEM[2] software to estimate landfill gas production, beginning with the year after the landfill opened. The values of these model input parameters are provided in Table 1. Landfill-specific data were obtained from a completed LMOP Landfill Profile[3], which is included in Appendix A. These data include the year the landfill opened, the landfill capacity, and the annual waste acceptance rate.

Also necessary for the model to run are the following parameters: L_o (methane generation potential), k (methane generation rate constant), and the percent volume of methane and carbon dioxide in the landfill gas. Defaults from AP-42 were used for L_o and k, and LandGEM software defaults were used for the percent methane and carbon dioxide. The AP-42 default value for k for non-arid areas was used because several sources indicated an average annual precipitation of greater than 25 inches for the area surrounding the landfill.

Collection of the landfill gas at its estimated extraction rate of 107 scfm in 2002 would be equivalent to any of the following annual environmental benefits for that year:

Removing emissions equivalent to 2,500 cars for one year
Planting 3,400 acres of forest
Offsetting the use of 56 railroad cars of coal
Preventing the use of 26,600 barrels of oil

Table 1: Model Input Parameters for the Oxford Landfill

Model Parameter	Value	Units
Year Landfill Opened	1973	----
Calculated Landfill Closure Year	1997	----
Waste Capacity (MSW only)	600,000	tons
Waste-In-Place (MSW only)	600,000	tons
Annual Waste Acceptance Rate	25,000	tons/yr
Methane Generation Rate Constant (k)	0.04	1/yr
Methane Generation Potential (L_o)	100.00	M^3/Mg
Percent Methane in Landfill Gas	50	%
Percent Carbon Dioxide in Landfill Gas	50	%

The estimated waste-in-place in tons and landfill gas generation in standard cubic feet per minute (scfm) for a 50-year period are shown in Table 2. Also provided is the estimated amount of landfill gas recovered over time, which was calculated using the assumption of an 85% collection rate. The graph was created using the landfill gas production and recovery data in Table 2. The curves demonstrate the landfill gas generation and recovery rates over time and the straight, vertical line indicates the current year.

Though this landfill appears to be very small, it does have some useful LFG generation potential for the future. The estimated LFG extraction rate for this year is estimated to be approximately 107 scfm. Based on the estimated LFG extraction rate, it would appear that the site would be capable of supporting a couple of microturbines or a greenhouse project (boiler option). Beneficial-use options are somewhat limited because of the relatively minimal LFG generation of the landfill.

These projections have been prepared specifically for the Oxford Landfill on behalf of the U.S. EPA Landfill Methane Outreach Program (LMOP), and are based on engineering judgement and represent the standard of care that would be exercised by a professional reasonably experienced in the field of landfill gas projections. LMOP and its contractors ERG and EMCON do not guarantee the quantity of available landfill gas, and no other warranty is expressed or implied. No other party is intended as a beneficiary of this work product, its content, or information embedded therein. Third parties use this information at their own risk. LMOP and its contractors ERG and EMCON assume no responsibility for the accuracy of information obtained from, compiled, or provided by other parties.

References

1. Compilation of Air Pollutant Emission Factors AP-42, Fifth Edition, Volume 1: Stationary Point and Area Sources. Chapter 2: Solid Waste Disposal. Section 2.4.4.1. U.S. EPA. November 1998. http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s04.pdf

2. Landfill Gas Emissions Model, version 2.01. U.S. EPA. January 6, 1999. http://www.epa.gov/ttn/catc/products.html

3. LMOP Landfill Profile Submitted by Jason Falls, County of Granville, N.C. to Chris Voell, USEPA LMOP. September 25, 2002. Shown in Appendix A.

Appendix A

Landfill Profile Containing Data for the Oxford Construction and Demolition Landfill

U.S. EPA's Landfill Methane Outreach Program (LMOP)
Landfill Profile

QUESTION	YOUR RESPONSE
Today's Date	9/25/02
In order to provide a more complete picture of the landfill gas production potential of the landfill, for any of the following questions, please specify here or within each response if you are answering for individual cells or for the entire landfill site?	Entire Landfill Site
Landfill Name	Oxford Construction and Demolition Landfill
Landfill Mailing Address, City, State, Zip	P.O. Box 906 Oxford N.C. 27565
Landfill Address or Location (if different from mailing address)	6584 Landfill Road Oxford, NC 27565
Landfill Owner Contact, Organization, Phone, Fax, e-mail	Granville County (919)603-1355; Fax (919)690-8610 recycle@granvillecounty.org
Landfill Operator Contact, Organization, Phone, Fax, e-mail (if different from owner)	Jason Falls
What is the Current Waste-In-Place (in tons or cu. yards)	Please circle one: (tons) / cubic yards Waste-in-place: greater than or equal to 500,000; your records indicate 800,000 If yards, indicate compaction ratio or waste density (lbs/cu.yd):
Total Permitted Design Capacity (in tons or cu. yards)	Please circle one: tons / cubic yards Not sure
Expansion Plans (news cells/when): • Information on expansion plans should specify the new capacities	Continue to accept C&D through 2004. 10 years of air space left
Annual Waste Acceptance Rate (in tons or cu. yards/year). • Is this rate expected to change or remain constant?	Please circle one: (tons) / cubic yards per year 25,000; expected to remain constant
Waste Composition (please indicate the % MSW, other organic wastes, C&D):	75 MSW, 25% C&D

% MSW, other organic wastes, C&D):	
Landfill Opening Year	1973
Landfill Closure Year	Jan. 1, 1998
Current Area Being Used for Landfilling (acres)	20
Current Average Waste Depth (feet)	100 ft. MSW; 25 feet C&D
Is Landfill Required by Regulation to Collect and Combust Landfill Gas? • Provide a brief description of NSPS/EG regulatory status (Tier II test, date)	Please Circle: Yes / No Details: Venting
Is a Landfill Gas Collection and Control System Currently in Place? • If yes, what is your existing LFG flow rate (scfm) and what percent is methane (% CH_4):	Please Circle: Yes / No Flow (scfm): % Methane:
Is a LFG Flare(s) in Operation? • If so, what is your existing LFG flow rate (scfm) to the flare and what percent is methane (% CH_4)	Please Circle: Yes / No Indicate number of flares: Flow (scfm): % Methane:
Project Status: On-line project, developing project, negotiations, feasibility study, or none. • If on-line, provide information on dates of operation, type and size of project (LFG flow in scfm and or MW capacity, end user)	
Electric utility and/or natural gas utility servicing the landfill or vicinity	Carolina Power and Light
Potential LFG End-Users (boilers, kilns, heavy industry, etc.) within 10 mile radius of landfill and their estimated distance from the landfill	See attached list of companies. A majority of them are located within a 5 mile radius or less.
Any other information you believe would be helpful to the LMOP	Historically, many different solid waste projects have been supported unanimously by the Granville County Board of Commissioners.